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UNITED STATES DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
Washington

Instrument Division

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GENERAL SPECIFICATIONS FOR INSTALLING CEILING-LIGHT
PROJECTORS.

Furnish such first-class materials and labor as are required
for installing one ceiling-light projector at

Location: The projector will be placed according to direction
of the Weather Bureau Official at a distance of about 500 feet from
the observing point, measured horizontally; where safe from injury
and convenient for observations, cleaning and wiring; also, if prac-
ticable, at a place from which the base line can be extended at some
future time should further experience demonstrate the need of a longer
base. It is not necessary that both clinometer and projector be at the
same level and exactly 500 feet apart, as is the case with the Depart-
ment of Commerce alidade, and projector.

*Installation:-For a deck exposure, mount the projector, if
of the flanged-base type, on a 4-inch pipe 40 inches long, erected
vertical with standard 4-inch flange unions screwed to the pipe at
top and bottom. Secure the flanged projector base to the upper pipe
flange with 1/2-inch through bolts, and fasten the lower pipe flange
of the support to the deck or roof by means of 1/2-inch through bolts,
or 1/2-inch lag screws for wood, or lag screws with expansion shields
for concrete. Use a 1/8-inch cork gasket between projector base and
flange.

When the projector is equipped with a "slip-fitter" base
instead of the flange, omit the upper pipe flange from the support.
The slip-fitter goes over the top end of the 4-inch pipe and fastens
thereto with set screws.

(Four-inch standard flange unions have an outside diameter of 7-3/4 inches, a height of 1-3/8 inches, with five bolt holes. See page 410, Crane and Co's Catalog, #53.)

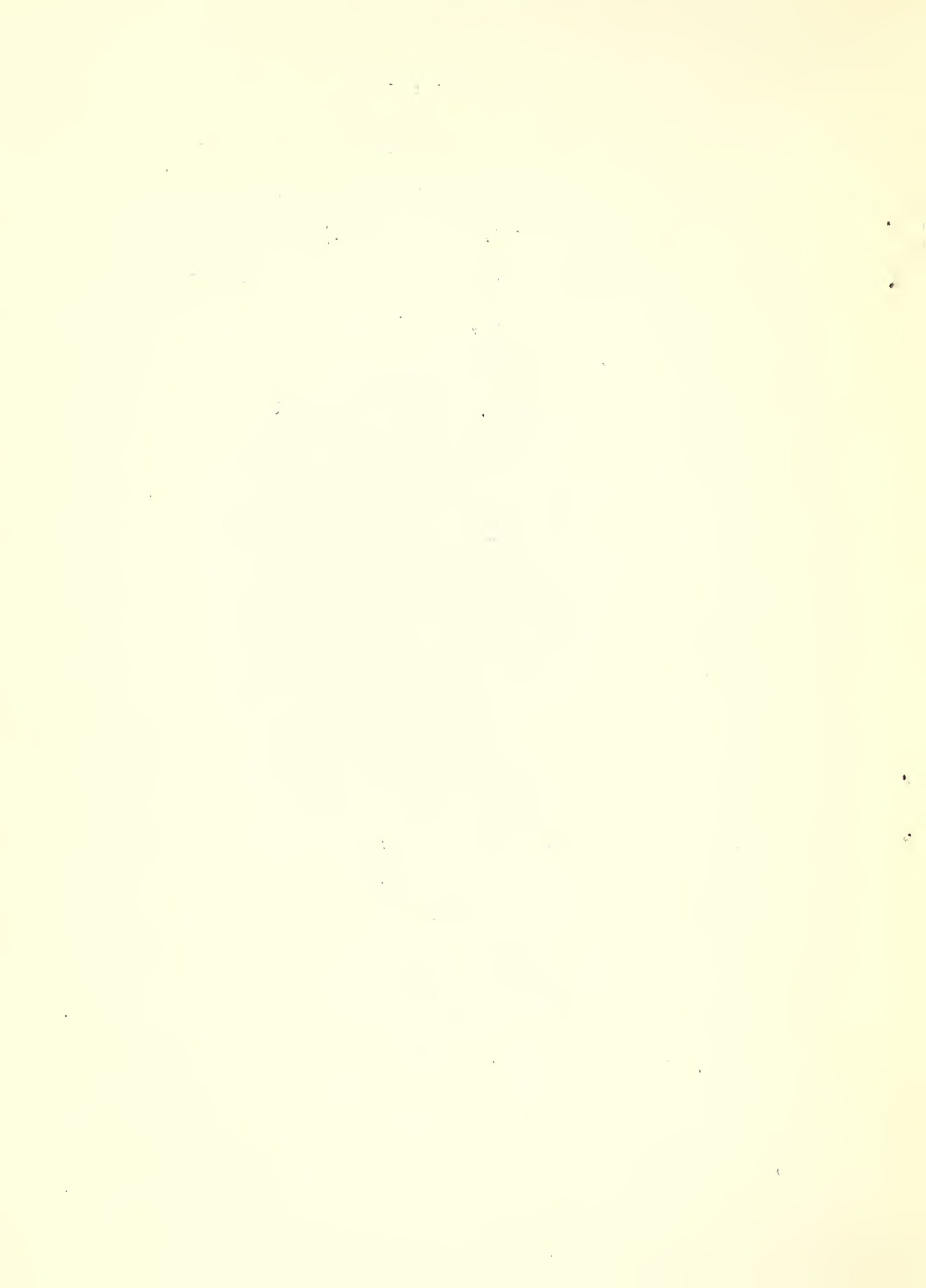
*For a ground exposure use one flange union for mounting a projector with a flange base, the pipe 6 1/2 ft. long and placed 3 ft. in the ground. Tamp the ground thoroughly about the pipe, placing rocks about it if available. Where this method does not result in sufficient rigidity of the support, surround the pipe at surface of ground with a concrete block about 18. in. square and 6 in. deep, the top of block 1 or 2 inches above surface of ground. Use a concrete of 1 part cement, 2 parts sand, and five parts crushed rock or stone. The projector will be mounted at the top of support as described above for a deck exposure.

Paint metal of support with red lead and a top coat of aluminum. Pipe in the ground will be given a coat of asphaltum.

Orient projector so that the beam may be directed either toward the place where observations are made, or to the zenith, as may be desired; that is, with the axis level and at right angles to a line from the projector to the observation point.

Wiring:- Run a separate circuit of two No. 10 wires from the fuse box or other electric service distributing point, to the projector, via a control switch placed where convenient, usually in the Weather Bureau Office. When a flanged-base projector is used, pass

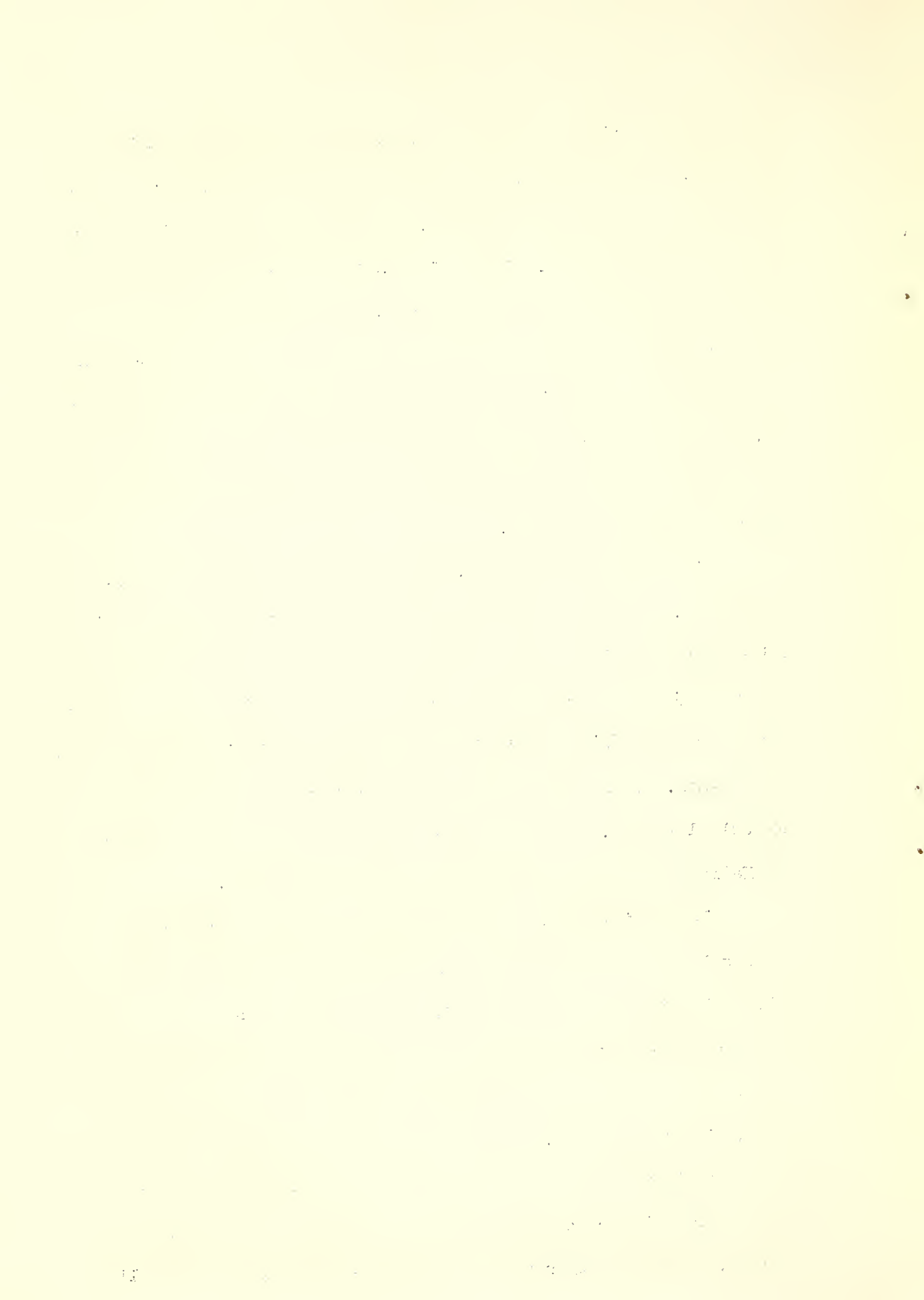
*NOTE: Use whichever paragraph is suitable in preparing bid Forms 33, and make such alterations as are necessary to fit the case.



the projector cable connected to the socket, through a hole in the pipe support just below the upper pipe flange (made reasonably watertight with a soft-rubber bushing), and splice to the service leads within the 4-inch pipe. When a "slip-fitter" is employed, pass the projector leads through the porcelain-bushed holes in same, to splices within the pipe as in the first case. Use a 30-ampere unfused switch for circuit control. For an underground circuit specify No. 10 duplex lead-covered metal-armored cable or when conditions are favorable specify instead cable with non-metallic sheathing such as Rome Trenchlay or equal.

For inside work use No. 10 BX, (BXL for damp locations), or wires in conduit. Bury the cable in a trench deep enough to prevent it from being molested. When using a cable with non-metallic sheathing protect it from injury by threading it through iron pipe; (1) when it passes under a roadway (2) where it is carried into a building from the bottom of a trench, or in general where it is particularly subject to mechanical injury. All wiring must conform to the requirements of the National Electrical Code and to local regulations.

Lamp adjustment:- Adjust filament of lamp furnished by Weather Bureau to focus of lens by sighting through peep holes drilled in side of projector drum, which, when aligned with a mark on the opposite side, causes the line of sight to pass through the focus. The center of lamp filament, when brought into the line of sight, will be in focus. A desirable method also is to direct the light beam horizontally on to a vertical white screen about 42 feet distant from the projector and adjust the lamp to the focal center of lens, determined by securing a sharply-defined and rounded light



spot on the screen. (See that the lamp provided is of voltage to suit the current. Voltage should be measured at the projector lamp socket when practicable with the lamp burning; otherwise estimate the socket voltage by subtracting from the service voltage 0.8 of a volt per 100 ft. of distance of projector from service, thus allowing roughly for line drop in potential. Lamps are available on Stores Requisition for 110, 115, 120 and 125-volt current.)

Caution: Some cases of severe burns have been reported due to reflection from the mirror when the sun shines upon it. A clean soft cloth or paper temporarily spread over the mirror will stop reflection while the focusing is being done. Or a time can be chosen when the sun is obscured by clouds.

LIST OF MATERIAL FOR ONE INSTALLATION.

- 1 Projector, ceiling light, (Furnished by Weather Bureau)
- 1 Switch, 30-ampere unfused.

(A toggle or push-button switch, flush-mounted, of the kind employed generally in house wiring may be used when desired or appropriate; or a knife switch on porcelain or other insulated base where appearance is not important.)

Cable, No. 10 duplex, solid copper wires, provided with high-grade water-proof insulation and sheathing for underground use; sheathing to be either metallic or non-metallic and give reasonable protection against accidental injury. Bidders will state makers designation of the kind of cable they propose to furnish.

SUPPORT:

- 1 piece 4-inch black steel pipe, 40" long, threaded at one or both ends according to type of projector, for deck exposure; or 6 1/2 ft. long unthreaded or threaded at one end, for ground exposure.

--Flange unions, 4-inch (number according to kind of installation.)

- 5, 1/2-inch lag screws, 2 1/2" long for deck exposure.

(Use 1/2" through bolts, if best; expansion shields for concrete; all omitted for ground installation.)

- 1/2-inch through bolts for attaching projector base to pipe flange. (Not required for slip-fitter base.)



2 Lamps, 250-watt, spotlightvolt, G 30 bulb.
(Furnished by Weather Bureau; Occasionally 500-watt
G 40 lamps are used, if conditions warrant it.)
The 30 and 40 refer to number of eighths of an inch
diameter.)

All material except that otherwise indicated will be furnished by the contractor.

Completion of work--Inspection: Upon completion of work the contractor will remove all excess materials and leave premises in good condition. All material excavated from trenches will be replaced therein after installation of cable.

All work shall be done in a thorough, neat and workmanlike manner, the contractor being responsible for any damage done to private property. Upon completion the job will be subject to the inspection and acceptance of the Weather Bureau official in charge of the installation before payment is made.

B. C. Kadel,
Chief of Instrument Division.

Revision Dec. 15, 1931, of similar
specifications dated Sept. 26, 1930.

